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CLAIMS:

1. A thermally tuned optical device comprising:

a diode laser having a substrate, a waveguide, and an active region between the substrate and the waveguide;

an electrical contact on the substrate, the substrate being at a substrate potential;

a metal layer in thermal contact with the waveguide;

a first electrical contact on the metal layer, whereby application of a first potential to the first electrical contact causes the diode laser to lase;

a second electrical contact on the metal layer, whereby application of a second potential to the second electrical contact causes a current to flow between the first electrical contact and the second electrical contact, thereby heating the laser.

2. The thermally tuned optical device of claim 1 wherein a dielectric separates the second electrical contact and the waveguide.

3. The thermally tuned optical device of claim 2 wherein the dielectric separates the metal layer and the waveguide at locations other than substantially about the first electrical contact.

4. The thermally tuned optical device of claim 3 wherein the waveguide is formed of a ridged InP cladding layer containing a grating.

5. The thermally tuned optical device of claim 4 wherein the ridged InP cladding layer has a top surface, with the metal layer in thermal contact with the top surface.

6. The thermally tuned optical device of claim 5 further comprising a thermoelectric (TE) cooler thermally coupled to the substrate.

7. The thermally tuned optical device of claim 6 wherein a plurality of waveguides are separated from the substrate by the active region, the optical device therefore forming an array of lasers.

8. The thermally tuned optical device of claim 7 wherein at least some of the lasers in the array of lasers lase at different wavelengths.

9. The thermally tuned optical device of claim 8 further comprising a plurality of metal layers, each of the metal layers in thermal contact with one of the lasers in the array of lasers, and for each metal layer:

a first electrical contact on the metal layer, whereby application of a first potential to the first electrical contact causes the diode laser to lase;

a second electrical contact on the metal layer, whereby application of a second potential to the second electrical contact causes a current to flow between the first electrical contact and the second electrical contact, thereby heating the laser.

10. The thermally tuned optical device of claim 9 wherein the second electrical contacts are tied to the same potential.

11. A thermally tuned laser array, comprising:

an array of ridged waveguide diode lasers, the ridges being separated by an interstripe area;

a metal contact on top of each ridge, each metal contact therefore corresponding to a laser in the array of lasers;

an interstripe metallization in each interstripe area;

with a one of the metal contacts set to a potential at least sufficient to cause the corresponding laser to emit light; and

with at least one interstripe metallization in an interstripe area about the one of the metal contacts set to a potential below that otherwise caused by setting of the one of the metal contacts to the potential at least sufficient to cause the corresponding laser to emit light.

12. The thermally tuned laser array of claim 11 wherein a plurality of the interstripe metallizations are set to the same potential.

13. A thermally tuned laser array, comprising:

an array of ridged waveguide diode lasers, the ridges being separated by an interstripe area;

a metal contact on top of each ridge, each metal contact therefore corresponding to a laser in the array of lasers;

an interstripe metallization in each interstripe area;

with a one of the metal contacts set to a potential at least sufficient to cause the corresponding laser to emit light; and

a plurality of isolation trenches, each of the isolation trenches being between an interstripe metallization and a ridge.

14. The thermally tuned laser array of claim 13 wherein an interstripe metallization is coupled to a current source adapted to provide a current to the interstripe metallization.

15. A method of thermally tuning a diode laser, the diode laser having an metal layer atop the laser and a substrate, the method comprising:

forward biasing the laser by placing at least a portion of the metal layer at a potential above the substrate to cause the laser to emit light; and

generating a current in the metal layer by placing at least a second portion of the metal layer at a potential different than the potential above the substrate, whereby heat is produced in the metal layer.

16. The method of claim 15 wherein the substrate is at a substrate potential, and the difference between the substrate potential and the potential above the substrate is significantly greater than the difference between the potential above the substrate and the potential different than the potential above the substrate.

17. A method of thermally tuning a diode laser in an array of diode lasers, the method comprising:

selecting a laser of the array of lasers;

providing a lasing current to the selected laser

coupling light emitted from the selected laser to an output;

providing a thermal current to a laser adjacent to the selected laser, whereby the thermal current causes the adjacent laser to generate heat.

18. The method of claim 17 wherein providing the thermal current to the adjacent laser results in forward biasing of the adjacent laser.

19. The method of claim 17 wherein providing the thermal current to the adjacent laser results in reverse biasing of the adjacent laser.

20. A method of thermally tuning a diode laser in an array of lasers on a common substrate, with a thermoelectric cooler coupled to the array of lasers, the lasers being tunable through application of a thermal signal to at least one contact on the array of lasers and through application of a signal to the thermoelectric cooler, the method comprising:

selecting a laser of the array of lasers;

applying the thermal signal to a contact on the array of lasers; and

applying the signal to the thermoelectric cooler.

21. The method of claim 20 further comprising deapplying the thermal signal to the contact on the array of lasers.

22. The method of claim 21 wherein deapplying the thermal signal to the contact on the array of lasers occurs after a predefined time interval.

23. The method of claim 21 wherein a magnitude of the thermal signal is based on a difference between an actual wavelength of light emitted from the selected laser and a desired wavelength of light emitted from the selected laser.

24. The method of claim 23 wherein deapplying the thermal signal to the contact on the array of lasers occurs when the magnitude of the thermal signal is below a predetermined magnitude.

25. The method of claim 23 wherein deapplying the thermal signal to the contact on the array of lasers occurs when the difference between the actual wavelength of light emitted from the selected laser and the desired wavelength of light emitted from the selected laser is below a predetermined magnitude.

26. A thermally tuned laser comprising:

a substrate;

an n-clad region on the substrate;

an active region on the n-clad region;

a p-clad layer on the active region, the p-clad layer including a ridge and a lightly doped region; and

metallization contacts proximate the ridge and about the lightly doped regions.

27. The thermally tuned laser of claim 26 wherein the lightly doped region extends substantially across the ridge.

28. The thermally tuned laser of claim 27 wherein the metallization contacts extend along the ridge.

29. The thermally tuned laser of claim 28 wherein the metallization contacts are reverse biased with respect to the laser.

30. The thermally tuned laser of claim 26 wherein the lightly doped region has a doping level of approximately $10^{15}/cm^3$.

31. The thermally tuned laser of claim 26 wherein the lightly doped region is close to the active region.

32. The thermally tuned laser of claim 31 further comprising a heavily doped region between the lightly doped region and the active region.

33. A thermally tuned laser of an array of lasers, the laser comprising:

a substrate having a top and a bottom;

a first contact on the bottom of the substrate;

a n-cladding layer on the top of the substrate;

an active region being on the n-cladding layer;

a p-cladding layer being on the active region and having a ridge, the ridge having a top;

a second contact on the top of the ridge;

a third contact on the p-cladding layer proximate to the ridge; and

a fourth contact on the p-cladding layer proximate to the ridge.

34. The laser of claim 33 wherein the third contact is on one side of the ridge and the fourth contact is on an opposite side of the ridge.

35. The laser of claim 34 wherein the third contact is on one side of the ridge and the fourth contact is on an opposite side of the ridge and a portion of both contacts are up and along a portion of the ridge.

36. The laser of claim 35 wherein the n-cladding is a n-type epitaxially grown InP lower cladding layer.

37. The laser of claim 36 wherein the active layer is an undoped InGaAsP quaternary active layer.

38. The laser of claim 37 wherein the p-cladding layer is a p-type InP cladding layer.

39. A thermally tuned laser of an array of lasers, the laser comprising:

a substrate having a top and a bottom;

a first contact on the bottom of the substrate;

a n-cladding layer on the top of the substrate;

an active region being on the n-cladding layer;

a p-cladding layer being on the active region and having a ridge, the ridge having a top;

a second contact on the top of the ridge;

a first contact region being on one end of the second contact;

a second contact region being on another opposite end of the second contact;

a connecting element coupling the first contact region to the second contact region; and

an insulating layer disposed between the ridge and both the second contact region and portions of the connecting element.

40. A method of thermal tuning, the method comprising:

selecting a laser from an array of lasers, the selected laser having a desired wavelength; and

activating a second laser proximate the first laser, such that thermal load on the second laser is sufficient to tune first laser.

41. The method of claim 40 further comprising reverse biasing the second laser, such that the second laser is prevented from emitting light.

42. A thermally tuned laser array comprising:

an array of lasers on a substrate;

means for providing a drive signal to lasers

making up the array of lasers;

means for providing a heating signal to lasers making up the array of lasers, the heating signal and the drive signal in conjunction resulting in heating of a laser in the array of lasers.